Oct. 8, 1968 D. MORANDUZZO 3,404,453

METHOD OF FORMING AN ELECTRIC LIGHT BULB SOCKET

Filed March 8, 1966 2 Sheets-Sheet 1

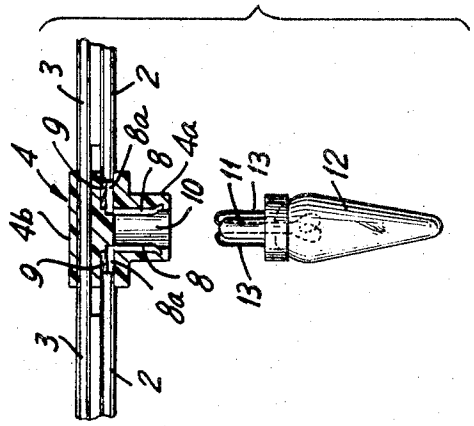

FIG. 2

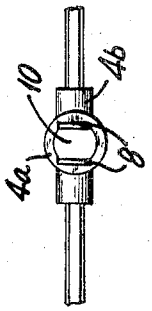

FIG. 3

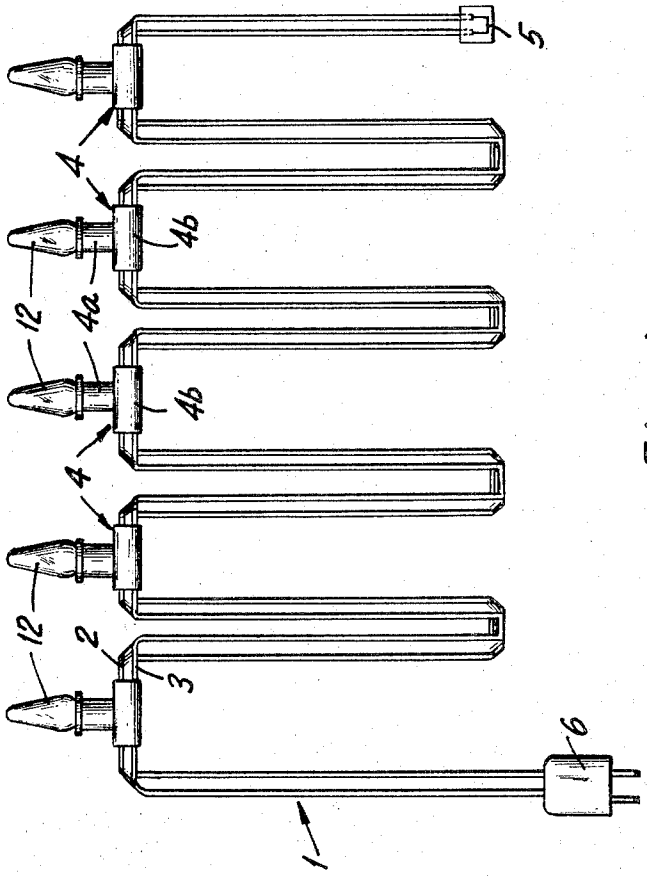

FIG. 1

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METHOD OF FORMING AN ELECTRIC LIGHT BULB SOCKET

Filed March 8, 1966 2 Sheets-Sheet 2

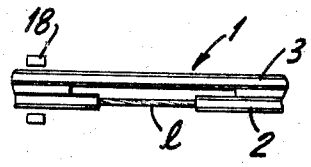

FIG. 4

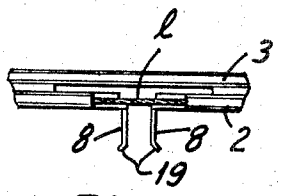

FIG. 6

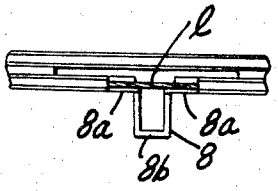

FIG. 5

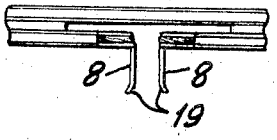

FIG. 7

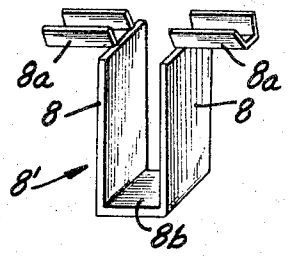

FIG. 8

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United States Patent Office

3,404,453

Patented Oct. 8, 1968

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3,404,453
METHOD OF FORMING AN ELECTRIC LIGHT BULB SOCKET

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Filed Mar. 8, 1966, Ser. No. 532,771
Claims priority, application Italy, June 18, 1965, 14,251/65, 14,252/65
3 Claims. (Cl. 29—628)

ABSTRACT OF THE DISCLOSURE

An electric light bulb socket construction comprises first and second connecting cables which are connected together in the form of a series circuit. A length of one of the cables is cut away and the two ends are connected to respective ones of two spaced apart flat terminal members which extend outwardly at substantially right angles from the severed cable in a direction away from the other cable. A feature of the construction is that a lamp receiving socket is formed by either molding or stamping a plastic socket around the two cables at the location of the flat terminals in a manner to embed a portion of the terminals within the socket thus formed with the terminals arranged in spaced opposed relationship. The socket thus formed is designed to receive a lamp having a base with a terminal element on each side of the base which will engage a respective terminal element of the socket.

This invention relates in general to electrical connecting devices for light bulbs and in particular to a new and useful electrical connecting line having socket means thereon for connecting a plurality of small light bulbs and to a method for making such line.

The present invention particularly relates to a type of electrical line which may be used, for example, for Christmas tree light bulb connections. The present invention is an improvement over the prior art, particularly in respect to the inexpensive construction of an electrical line for this purpose and also to the method for manufacturing the same. The invention construction includes socket means formed at selected intervals along the length of parallelly running connecting cables. The socket means are formed at spaced intervals along the cables by pressure forming a plastic socket directly over the cable. The invention makes it possible to form any number of relatively small sized socket bases of a thermoplastic material for the purpose of supporting preferably plug-in type lamps or bulbs. The arrangement is particularly applicable for use in a series line connection which includes an outgoing cable connected at its outer end to a return cable and with miniature socket elements being formed across the two cables at spaced locations along their length. With the invention, one of the cables which is to supply the current to the bulbs in a socket is bared and severed and the two severed ends are connected to respective conductive terminal elements. The terminal elements advantageously comprise sleeve members which are fitted over the conductive ends of the bared cables and include portions bent at right angles thereto which will form terminals for connecting a lamp into the severed line. The two terminals are oriented in a fixed spaced relationship so that they face each other and then a socket member of plastic is formed directly over the two cables and the terminals which become embedded in opposite walls of a lamp receiving socket extension. The socket extension is advantageously made with a non-circular recess to permit the plug-in connection of a lamp bulb of a type having exposed contacts which will be aligned with the contact terminals formed in the plastic material.

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In the preferred method of the invention it is a simple matter to first form the two current lines with a terminal plug for insertion into a house current receptacle. The lines are joined together at their opposite ends to join them in a series circuit. Thereafter, the insulation is removed from one of the connecting cables at selected distances along its length. A stamped conductive terminal of U-shaped configuration is then positioned so that laterally projecting lugs on each side may be electrically and mechanically connected to the bared cable. The web center of the U-shaped portion is then severed, leaving two spaced metal terminals oriented in spaced relationship to each other which form terminals after the bared length of cable therebetween is also severed. Thereafter, a plastic socket member is formed directly over the spaced terminals to complete the electrical line formation for one socket. The socket projects from the line and the terminals become partially embedded in opposite walls so that they project for electrical connection.

Accordingly it is an object of the invention to provide an improved electrical connecting circuit, particularly for small sized lamps.

A further object of the invention is to provide an electrical connecting circuit which includes a series connecting cable extending outwardly from a terminal plug and then backwardly to the plug, with one of the connecting branches being severed at least at one location along the length thereof and with metallic terminals affixed thereto at the severed ends which are arranged at spaced locations and including a stamped or molded plastic socket formation formed around the terminals in a manner such that the socket which is formed holds the terminals in spaced relationship for completing an electrical connection with a bulb inserted into the socket.

A further object of the invention is to provide an improved method of forming an electrical light connection, particularly for lamps, in which a molded socket is formed around spaced terminals which are electrically connected to the cables of the circuit in a manner such that the spaced terminals are embedded in the wall at spaced locations for receiving a lamp therein and making electrical contact therewith.

A further object of the invention is to provide an electrical current line for relatively small sized lamps which is simple in design, rugged in construction and economical to manfacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

In the drawings:

FIG. 1 is an elevational view of a Christmas tree bulb connecting circuit constructed in accordance with the invention;

FIG. 2 is a partial transverse sectional view with one of the sockets indicated in FIG. 1, with the lamp bulb shown removed from the socket;

FIG. 3 is a top plan view of one of the sockets indicated in FIG. 1, but with the light bulb removed;

FIGS. 4 to 7 are partial plan views of a portion of the connecting lines showing the steps of forming the socket thereon in accordance with the method of the invention; and

FIG. 8 is a perspective view of a terminal plug employed in accordance with the method of the invention for forming the socket terminals.

Referring to the drawings in particular, the invention embodied therein comprises a flexible bifilar strip gen-

erally designated **1** which includes two conductor cable branches **2** and **3** which are connected at their ends to respective terminals of a plug member **6** and are joined together at their opposite end and covered by means of a shield member **5** which is secured to the strip **1**.

In accordance with the invention, the electrical circuit connection includes a plurality of socket members **4** which are formed in accordance with the method of the invention by stamping or molding the sockets of a thermoplastic material over the strip **1** at selected locations along its length. The thermoplastic material is also electrically insulating.

As indicated in FIG. 2, the socket **4** is formed after the insulation is removed from a short length of one of the connecting cable branches, in this instance the branch **2**. The cable **2** is severed to form bared terminals **9**, **9** which are then each connected to a separate lamp socket terminal member **8**. For this purpose each socket terminal member **8** includes a cylindrical portion **8***a* which fits over the associated terminal **9** and is secured thereto such as by press-fitting or crimping. The portion **8***a* stands at substantially right angles to the main terminal portions so that they may be connected to the cables in a simple manner. The outer ends of the terminals **8**, **8** are then arranged in spaced parallel relationship and a socket member **4** is formed by stamping or molding a plastic material around the cables **3** and **2** and projecting outwardly therefrom in the from of a socket extension **4***a* which is at right angles to a socket base **4***b*. The socket extension **4***a* is provided with a recess or cavity **10** for receiving a base or foot portion **11** of a lamp bulb **12**. The lamp bulb **12** is of a type which includes exposed terminals **13**, **13** and is of a shape such that it may be press-fitted within the socket **10**. The terminals **8**, **8** are embedded in opposite sides of the socket **12**, and when the lamp **12** is properly oriented with its base **11** in the socket, the terminals **13**, **13** are connected to respective terminals **8**, **8**.

The first socket assembly **4** is advantageously formed along a length of the strip **1** at a fixed distance from the plug **6** which is established in accordance with the particular light set which is to be employed. The sockets **4** are formed in a rigid manner at the fixed location indicated along the strip **1**, and the construction is such that the contact terminals will be anchored within the plastic, there being little or no possibility that they may become loosened. By stamping or molding or otherwise pressure-forming the plastic material socket it is assured that a permanent insulation will be applied around the severed portions of the connecting cable and that the contacts will be protected against penetration by moisture and may be used outdoors. By forming the socket elements in situ, the manufacturing process is vastly simplified and thus is less expensive.

In the preferred method of the invention, a U-shaped terminal member generally designated **8'**, as indicated in FIG. 8, is advantageously used for forming the two terminals **8**, **8**. This member includes laterally projecting trough-shaped elements **8***a*, **8***a* on each side of the top, and a central web portion or bight portion **8***b* formed between the lower ends of the terminals **8**, **8**. The trough-shaped members **8***a* form channels for permitting easy orientation of the terminal elements to the wires in the method of the invention.

As indicated in FIGS. 4 to 7, the process of the invention is carried out by first locking a length of the cable strip **1** into a locking jig having clamping means schematically indicated **18**. Thereafter a length *l* of the cable **2** is bared by removing the insulation covering and also a portion of the strip webbing of the strip **1** is removed. The terminal member **8** is then inserted so that the trough-shaped portions **8***a*, **8***a* are aligned over the cable length *l* and the sides of the trough-shaped portions are bent over the cable to provide a secure electrical connection which may also be soldered.

In FIG. 6 it is indicated how the web portion **8***b* is removed and the outer ends of the terminals **8**, **8** are bent outwardly, as indicated at **19**. As indicated in FIG. 7, the cable lying between the terminal portions **8**, **8** is then severed. Thereafter, the plastic socket **4** is then formed directly over the bifilar strip **1** in a manner such that the socket portion **4***a* projects outwardly from the cylindrical base portion **4***b*. By stamping the socket member **4** in situ, it is assured that the insulation around the exposed length of wire *l* will be absolutely maintained and protected from any weather effects.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A method of forming an electrical line connection for small light bulbs using an electrical line having two conductor cables arranged in spaced parallel relationship and connected together in a series circuit fashion, each of these cables being covered with insulation, comprising removing the insulation to bare a length of one of said two conductor cables, affixing the inner ends of two spaced terminal members to the bared cable and electrically connecting each of the inner ends to the bared cable at respective spaced locations and in a manner so that the terminals extend outwardly at spaced locations and at substantially right angles to the bared cable, severing the bared length of cable intermediate the length thereof to form two electrically isolated spaced ends, forming a plastic socket with a lamp receiving recess around at least the bared cable in the area of the connection to the respective terminal inner ends and embedding at least a portion of the spaced apart terminals in the plastic socket so that they are oriented in spaced opposed relationship with at least a portion of the terminals exposed in the lamp receiving recess, said lamp receiving recess being formed of the plastic in a configuration to receive a socket of a lamp bulb for connection of the bulb to the terminals in the socket.

2. A method according to claim **1**, using a substantially U-shaped terminal member including a central bight portion and two leg portions for forming the connecting terminals and comprising positioning the terminal member with the ends of the leg portions engaged with the respective cable spaced ends, and mechanically clamping the terminal member leg portion ends to the respective cable ends, and thereafter severing the bight portion of the U-shaped terminal to form two separate terminals which project outwardly from the cable.

3. A method according to claim **2**, wherein the ends of the leg portions of said terminal member which are formed by cutting away said bight portion are bent outwardly prior to the forming of said plastic socket to permit these ends to be embedded in the plastic socket.

References Cited

UNITED STATES PATENTS

1,722,737	7/1929	Eckstein et al.	339—155
1,728,938	9/1929	Kirschstein	315—192
1,979,485	11/1934	McPartlin et al.	339—59
2,071,948	2/1937	Peters	339—157
2,723,383	11/1955	Franc	339—176
2,944,330	7/1960	Swick	339—217 XR

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